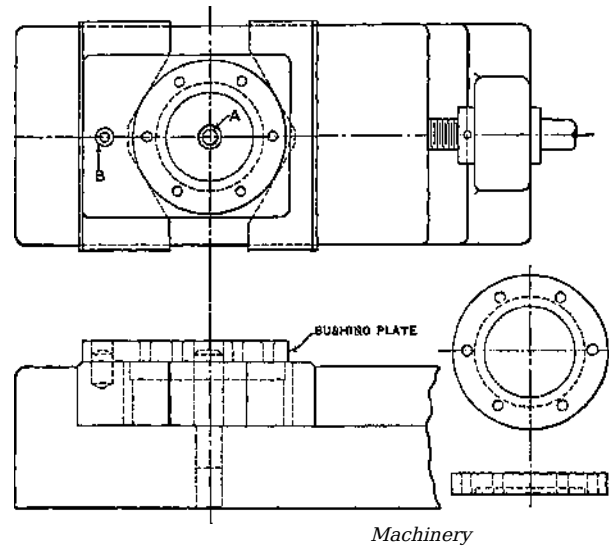


in principle, are special in construction. Not all shops can afford the costly design that the manufacture of guns or automobiles will warrant. They must compromise on the cheaper and less effective equipment that can be adapted quickly to a wide range of work, and the machine vise, as shown in the foregoing, can be made a universal fixture within its limits.

Multiple Drilling Jig of Reversible Type. — The drilling of the spoke holes in the hubs of motorcycles is illustrated in Fig. 34.



Machinery

Fig. 33. Vise provided with Removable Bushing Plate for Drilling Holes on a Circle

These hubs are made of low carbon steel and the end flanges through which the holes are drilled are  $\frac{1}{8}$  inch thick. Through each flange, sixteen No. 25 holes are

drilled at a slight angle so that the direction of the drilling is along the lines of a cone. The distance between the holes is about one-half inch.

The spindles of the multiple-spindle drilling machine in which the work is done are guided in their inclination by a steel ring supported from the head of the machine. The jig is of the swiveling type, permitting the holes in one end of the hub to be drilled, after which the work-holding part of